

Serial No. 09/768,115  
Response to Office Action  
Attorney Docket No. 38830.253270  
Page 3 of 3

### REMARKS

Claims 63-64 are pending in the present application. By this Amendment, Claims 61-62 have been canceled; and Claims 63-64 have been added. Applicants respectfully request reconsideration of the present claims in view of the foregoing amendments and the following remarks.

#### I. Formal Matters:

##### Rejection under 35 U.S.C. § 112, second paragraph

The Examiner rejected Claims 61-62 under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite for what structural limitations are present in the invention. This rejection is respectfully traversed. While Claims 61-62 have been canceled, Applicants respectfully submit that new Claims 63-64 provide the necessary structure to adequately describe the claimed invention such that these claims are definite. The claims provide a medium that is a porous, rigid structure in the shape of a sheet or a block. The medium is constructed and arranged to immobilize microorganisms on a surface of the pores of the medium while also being constructed and arranged to permit an external agent to contact the immobilized microorganisms. As such, any porous material that is able to support fluid flow through it and that is able to immobilize microorganisms may be used while also permitting the microorganisms to be contacted with a secondary material, such as a fluid, may be used in the present invention. And as Applicants have taught that the materials of the invention are useful for treating the solutions contained in different embodiments, such as fermentation broths, a recycled stream in a chemical or biological process, and a recycled stream in a cell culturing process, Applicants have provided sufficient disclosure to permit one skilled in the art to understand the structural limitations necessary for any given embodiment. As such, Applicants respectfully submit that Claims 63-64 are definite.

#### II. Prior Art Rejections:

##### Claim Rejections under 35 U.S.C. § 102(b)

Claims 61-62 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,645,503 to Lin et al. (hereafter "Lin") or under 35 U.S.C. § 103(a) as being unpatentable over Lin in view of U.S. Patent No. 5,422,340 to Ammann et al. (hereafter "Ammann"). This rejection is respectfully traversed.

Applicants' claimed invention, as set forth in Claim 63, is drawn to, *inter alia*, an immobilization and contacting medium for microorganisms, comprising apatite and a binder

*Serial No. 09/768,115  
Response to Office Action  
Attorney Docket No. 38830.253270  
Page 4 of 4*

therefore, wherein the medium is in a rigid, porous form selected from a block and a sheet, further wherein the medium is constructed and arranged to immobilize microorganisms on a surface of the pores of the medium while also being constructed and arranged to permit an external agent to contact the immobilized microorganisms.

Lin discloses the sterilization of a material that contains hydroxyapatite and a binder.

Ammann discloses a formulation suitable for inducing bone formation contains about 0.5  $\mu\text{g}$  to about 5 mg of transforming growth factor- $\beta$  and about 140 mg to about 50 g of tricalcium phosphate and excludes a bone morphogenetic cofactor.

It is respectfully submitted that Lin and/or the combination of Lin and Ammann each fails to teach or suggest Applicants' claimed invention. While Claims 61-62 have been canceled, Applicants will address the propriety of the prior art in regards to new Claims 63-64 as they are similar in scope to Claims 61-62. Applicants' claimed invention does not refer to "immobilization" and "contacting" of the medium to be a singular process where microorganisms interact and are retained on the composite's surface. Applicants invention as claimed is directed towards a medium capable of being used in a two-step process that includes, 1) immobilizing microorganisms on the composite's surface, and 2) contacting them with an external agent, such as a fluid, and chemical species carried by the fluid. In one example using these claims, fluid containing chemical reagents that aid in identifying microorganisms could flow into the composite and "contact" the microorganisms which are immobilized on the composite's surface. Lin does disclose a sterilization process that is used to kill microorganisms,. However, this sterilization process is not a process that requires that there be sufficient porosity for fluid to flow through the material. Lin does not teach or suggest anything other than outer surface contamination of the material. However, the composite and method claimed by Applicants provide that microorganisms are immobilized throughout the material and that fluids flowing through the material are capable of contacting the microorganisms. This is further shown in Claim 62, wherein the pores referred to by Applicants include the surface of the channels that generate the tortuous path through the material. As such, it is respectfully submitted that Lin fails to teach or suggest Applicants' claimed invention.

Additionally, as Ammann also fails to teach or suggest these advantages, Ammann fails to correct the deficiencies of Lin and the combination of Lin and Ammann fails to teach or suggest Applicants' claimed invention.

For at least the reasons given above, Applicants respectfully submit that Claim 63 is allowable over the art of record. Furthermore, since Claim 64 recites additional claim features

*Serial No. 09/768,115  
Response to Office Action  
Attorney Docket No. 38830.253270  
Page 5 of 5*

and depends from Claim 63, this claim is also allowable over the art of record. Accordingly, Applicants respectfully request withdrawal of this rejection.

Claim Rejections under 35 U.S.C. § 103(a)

Claims 61-62 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,676,745 to Kelly et al. (hereafter "Kelly") or as being unpatentable over Kelly in view of Lin. This rejection is respectfully traversed.

Applicants' claimed invention may be relied upon as discussed above.

Kelly is directed to a process for low temperature formation of porous ceramic-based composite materials using a ceramic powder and an organometallic pre-ceramic precursor.

Applicants' discussion of Lin may be relied upon as discussed above.

It is respectfully submitted that Kelly and/or the combination of Kelly and Lin each fails to teach or suggest Applicants' claimed invention. While Claims 61-62 have been canceled, Applicants will address the propriety of the prior art in regards to new Claims 63-64 as they are similar in scope to Claims 61-62. Again, Kelly does not teach or suggest porous material formed by the process that is capable of permitting the flow of fluid therethrough. Kelly also fails to teach or suggest pores in the hydroxyapatite that may have microorganisms on the pores after the initial coating or subsequent pore-filling operations. In fact, Kelly teaches away from the present invention by teaching that the composite material is coated onto a fluid impermeable structure, such as a titanium implant. As such, there would be no need for fluid flow through the resultant coated material, thus the porosity would not need to support such. Further, since Kelly teaches a material that is useful in preparing metal substitutes for use underwater, these materials would not be desired to support fluid flow therethrough. As such, it is respectfully submitted that Kelly fails to teach or suggest Applicants' claimed invention.

Additionally, as set forth above, Lin also fails to teach or suggest these advantages. As such, Lin fails to correct the deficiencies of Kelly and the combination of Kelly and Lin fails to teach or suggest Applicants' claimed invention.

For at least the reasons given above, Applicants respectfully submit that Claim 63 is allowable over the art of record. Furthermore, since Claim 64 recites additional claim features and depends from Claim 63, this claim is also allowable over the art of record. Accordingly, Applicants respectfully request withdrawal of this rejection.

*Serial No. 09/768,115  
Response to Office Action  
Attorney Docket No. 38830.253270  
Page 6 of 6*

**III. Conclusion:**

For at least the reasons given above, Applicants submit that Claims 61-62 define patentable subject matter. Accordingly, Applicants respectfully request allowance of these claims.

The foregoing is submitted as a full and complete Response to the Office Action mailed April 23, 2003, and early and favorable consideration of the claims is requested.

Should the Examiner believe that anything further is necessary in order to place the application in better condition for allowance, the Examiner is respectfully requested to contact Applicants' representative at the telephone number listed below.

No additional fees are believed due; however, the Commissioner is hereby authorized to charge any deficiency, or credit any overpayment, to Deposit Account No. 11-0855.

Respectfully submitted,



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Attorney Docket No.: 38830.253270